Study:

Three-year randomised study of manual and power toothbrush effects on pre-existing gingival recession

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Relevant background:

Gingival recession is the exposure of the root surface following apical migration of the gingival margin, resulting in the exposure of cementum/dentin. Dental plaque, gingivitis, age, gender, and smoking are risk indicators for buccal gingival recession. Tooth-brushing techniques, frequency, and duration have also been associated with gingival recession in observational studies. However, there is inconclusive evidence that gingival trauma from tooth-brushing results in recession or whether power brushes cause more soft-tissue trauma than manual brushes.

Study aims:

The aim of this long-term, prospective, randomised, controlled clinical study is to examine the influence of tooth-brushing with a widely available oscillating-rotating power toothbrush and a manual reference toothbrush on subjects with pre-existing recessions. The results of the first (six-month) phase of this study have been published previously. The present paper reports the results after 12, 18, and 35 months.

Methods:

At baseline, subjects recruited from the general population were eligible for inclusion if they were 18-70 years old, healthy, had 18 scorable teeth with at least two showing pre-existing buccal recession (≥ 2mm).

Participants were stratified based on initial pre-existing gingival recession, gender and smoking status, and were randomly assigned in two groups: power toothbrush and manual toothbrush. The test group used oscillating-rotating and pulsating power brushes – D17U, Oral-B Professional Care, Procter & Gamble (n=55) – while the control group used ADA reference flat trim manual brushes (n=54). Participants in both groups were instructed to brush their teeth twice a day for two minutes with a standard sodium fluoride dentifrice. Test group had to follow the manufacturer's instructions, while subjects in the control group was told to continue brushing as they normally do. Over three years, new brush heads, toothbrushes, and dentifrice were provided every three months.

Clinical assessments were carried out by the same blinded calibrated examiner at baseline, 6, 12, 18 and 35 months. The recorded clinical parameters were: oral safety assessments of soft and hard tissue, the Löe and Silness gingival index, the Turesky modification of the Quigley and Hein plaque index, periodontal pocket depths (PPD)

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Methods:
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and clinical attachment level (CAL) on six sites per teeth. The gingival recession was calculated as the difference between CAL and PPD.

The primary outcome variable was the mean recession change at pre-existing recession sites at baseline (first-level analysis). The patient was considered as the statistical unit but recession changes at both the tooth and site level were considered as secondary outcomes (second-level analysis). Changes in recession between visits were analysed using ANOVA. A two-step logistic regression analysis was performed to explore the influence of relevant factors on the results.

Results:

At baseline, 109 participants were included, 54 used a manual brush (mean age = 32.2±8.9) and 55 used a power brush (mean age = 33.6±10.2). During the course of the study, 34 patients withdrew for several reasons (pregnancy, moving to another city, and no further interest in participating in the study).

- A significant reduction in gingival recession was observed in both groups from the baseline up to 35months (0.45 to 0.5 mm). Group differences were non-significant for all comparisons of changes in recession between study time points.

- The multiple logistic regression analysis showed on the tooth level a statistically significant higher risk of change in gingival recession for canines and first premolars compared to the second molar, and a lower risk of change in gingival recession at the upper jaw compared to the lower jaw.

- The use of a power brush reduced the risk of change in gingival recession compared to the use of a manual brush.

Limitations, conclusions and impact:

Limitations:

- The main limitation is the Hawthorne effect as a consequence of behavioural modifications caused by the participation in an investigation.

- It is noteworthy that patients in the test group had written instructions from the power toothbrush manufacturer whereas the control group did not receive written instructions.

- No sample size calculation was made prior to the study.

- The population's age range was large (18 to 70 years old) leading to possible bias.

- It was a two-sided analyses leading to equivalence and not superiority of one of the brushing techniques.

- The study was sponsored by Procter & Gamble.

Conclusions:

A daily regimen of two minutes' power or manual tooth brushing appears to have no adverse effect on pre-existing gingival recession. Furthermore, a significant reduction in gingival recession (near 0.5 mm) was observed in both groups over three years with no inter-group differences.

Impact:

Clinicians can safely prescribe either manual or power toothbrush even for patients with pre-existing gingival recessions.